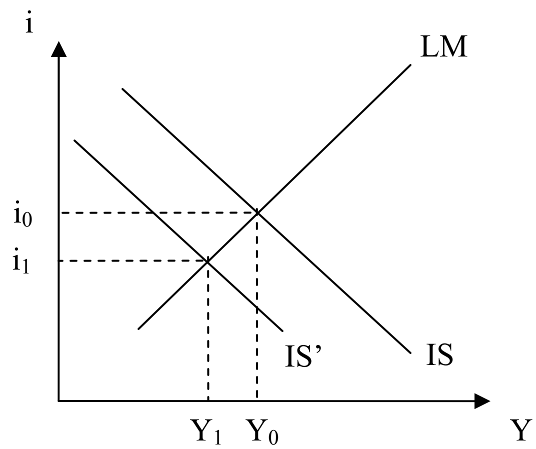
1. Question 3 on p. 107 of Blanchard (continues on page 108)



The IS curve shifts down to IS’, output falls to Y_1 and the interest rate declines to i_1. The decrease in the interest rate will tend to push up the level of investment.

a. First, invert the LM condition to find the interest rate:

$$i = (d_1 / d_2)Y - (1/d_2)(M/P) \quad \text{Equation (*)}$$

Substituting this equation, along with the investment and consumption functions, into the goods market clearing equilibrium, we obtain:

$$Y = c_0 + c_1Y - c_1T + b_0 - (b_2d_1/d_2)Y - (1/d_2)(M/P) + G$$

Solving this equation for Y, we obtain the equilibrium value:

$$Y^* = (1 - c_0 - b_1 + b_2d_1/d_2)^{-1} [c_0 + b_0 - c_1T - (1/d_2)(M/P) + G]$$

b. The equilibrium interest rate can be obtained by plugging Y^* into equation (*):

$$i^* = (d_1 / d_2)Y^* - (1/d_2)(M/P)$$

c. Equilibrium investment can be obtained by plugging i^* into the equation for I:

$$I^* = b_0 + b_1Y^* - (b_2 d_1 / d_2)Y^* + (b_2/d_2)(M/P)$$

Or, simplifying:

$$I^* = b_0 + [b_1 - (b_2\, d_1 / d_2)]\, Y^* + (b_2/d_2)(M/P)$$

d. From our answer to part c., it is clear that G impacts investment through its impact on equilibrium GDP (Y^*). Inspecting the answer to a., if $1 + b_2d_1/d_2 > c_0 + b_1$ then government spending has a positive impact on equilibrium GDP (the multiplier is positive). We will assume this is the case, so that a decrease in G will decrease Y^*.

   Next, we must look at the answer to part c. in order to determine when a decrease in Y^* will increase I^*. If $(b_2\, d_1 / d_2) > b_1$, then a decrease in Y^* will be met with an increase in I^* since there is a negative coefficient on real GDP in the investment solution. In summary, the conditions for are:

$$1 + b_2d_1/d_2 > c_0 + b_1$$
$$(b_2\, d_1 / d_2) > b_1$$

e. The first condition guarantees that the multiplier is positive, so that lower government spending reduces production. The second condition guarantees that the “crowding-in” effect in investment dominates the output effect, that is, that the lower interest rate from lower government spending has a sufficiently large impact on the level of investment.

2. Question 3 on p. 131 of Blanchard

   a) The real wage will be $W / P = (1.05)^{-1} = .95$.
   b) The natural rate of unemployment can be found by combining wage setting and price setting so that $.95 = 1 – u$. Finding u, we obtain a natural rate of 5%.
   c) If markups rise to .1 then wage setting gives us a real wage of $(1.1)^{-1} = .91$. Combining this result with prices setting, we find a natural rate of unemployment of 9%. Intuition: when markups increase, the nominal wage will buy consumers fewer goods, this means that working provides a lower benefit. This will cause individuals to withdraw their labor, thereby increasing the unemployment rate.

3. Suppose that an economy produces output according to $Y = N$ and that the demand for output is determined by $Y = P^{-\eta}$ (η is the elasticity of demand). Each unit of labor is purchased at a wage rate of W. This is a tough one.

a) Write down a profit function for the economy. Make sure your profit function only has P and W as arguments.

$$prof = P*Y - W*N$$

Substituting the demand function for Y and the production function for N, we have:

$$prof = P^{1-\eta} - W* P^{-\eta}$$

b) Suppose a monopolist set prices in the economy in order to maximize profits. What is the first-order condition characterizing profit maximization?

We will take the partial derivative of profits with respect to prices and set this equal to zero. We obtain:

$$\partial\, prof / \partial P = (1 - \eta)* P^{-\eta} + \eta*W*P^{-\eta-1} = 0$$

c) Solve for the profit-maximizing level of prices.

Solving for P, we find that the profit-maximizing level of prices is:

$$P = (W*\eta) / (\eta - 1)$$

d) Can you express the markup (μ) in terms of the elasticity of demand? How does elasticity relate to the markup (inversely or positively)?

It must be that

$$\eta / (\eta - 1) = 1 + \mu$$

Solving for the markup, we obtain:

$$\mu = 1 / (\eta - 1)$$

There is an inverse relationship between markups and the elasticity (a higher elasticity leads to lower markups).